all valves, piping, and protective devices conform to the requirements of the specification. If it does not so certify, the installer of any such valve, piping, or device shall supply and the owner shall obtain a certificate asserting complete compliance with these specifications for such devices. The certificate, or certificates, will include sufficient sketches, drawings, and other information to indicate the location, make, model, and size of each valve and the arrangement of all piping associated with the cargo tank.

(4) The certificate must contain a statement indicating whether or not the cargo tank was postweld heat treated for anhydrous ammonia as specified in §178.337–1(f).

(b) The owner shall retain the copy of the data report and certificates and related papers in his files throughout his ownership of the cargo tank motor vehicle and for at least one year thereafter; and in the event of change in ownership, retention by the prior owner of nonfading photographically reproduced copies will be deemed to satisfy this requirement. Each motor carrier using the cargo tank motor vehicle, if not the owner thereof, shall obtain a copy of the data report and certificate and retain them in his files during the time he uses the cargo tank motor vehicle and for at least one year thereafter.

[Order 59–B, 30 FR 583, Jan. 16, 1965. Redesignated at 32 FR 5606, Apr. 5, 1967]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §178.337–18, see the List of CFR Sections Affected which appears in the Finding Aids section of the printed volume and on GPO Access.

§178.338 Specification MC–338; insulated cargo tank motor vehicle.

§178.338–1 General requirements.

(a) For the purposes of this section—

(1) *Design pressure* means the ''MAWP'' as used in the ASME Code, and is the gauge pressure at the top of the tank.

(2) *Design service temperature* means the coldest temperature for which the tank is suitable (see §§173.318 (a)(1) and (f) of this subchapter).

(b) Each cargo tank must consist of a suitably supported welded inner vessel enclosed within an outer shell or jacket, with insulation between the inner vessel and outer shell or jacket, and having piping, valves, supports and other appurtenances as specified in this subchapter. For the purpose of this specification, *tank* means inner vessel and *jacket* means either the outer shell or insulation cover.

(c) Each tank must be designed and constructed to meet the requirements of the ASME Code.

(1) The design pressure of the tank must be at least 25.3 psig but not more than 500 psig. To determine the required thicknesses of the parts of the tank, the static head of the lading shall be added to the design pressure. If the jacket is evacuated, the tank must be designed for a pressure of 14.7 psi, plus the lading static head, higher than its design pressure. The jacket must be designed in accordance with paragraph (e) or (f) of this section, as appropriate.

(2) The design service temperature of the tank, piping and valves may not be warmer than the liquefaction temperature at one atmosphere of the lading to be transported (see §§173.318 (a)(1) and (f) of this subchapter).

(3) Design and construction details of the tank interior may not allow collection and retention of cleaning materials or contaminants. To preclude the entrapment of foreign material, the design and construction of the tank must allow washing of all interior surfaces by the normal surging of the lading during transportation.

(d) The exterior surface of the tank must be insulated with a material compatible with the lading.

(1) Each cargo tank must have an insulation system that will prevent the tank pressure from exceeding the pressure relief valve set pressure within the specified holding time when the tank is loaded with the specific cryogenic liquid at the design conditions of—

(i) The specified temperature and pressure of the cryogenic liquid, and

(ii) The exposure of the filled cargo tank to an average ambient temperature of 85 °F.

(2) For a cargo tank used to transport oxygen, the insulation may not sustain combustion in a 99.5 percent oxygen atmosphere at atmospheric pressure when contacted with a continuously

heated glowing platinum wire. The cargo tank must be marked in accordance with §178.338–18(b)(7).

(3) Each vacuum-insulated cargo tank must be provided with a connection for a vacuum gauge to indicate the absolute pressure within the insulation space.

(e) The insulation must be completely covered by a metal jacket. The jacket or the insulation must be so constructed and sealed as to prevent moisture from coming into contact with the insulation (see §173.318(a)(3) of this subchapter). Minimum metal thicknesses are as follows:

Type metal	Jacket evacuated		Jacket not evacuated	
	Gauge	Inches	Gauge	Inches
Stainless steel	18	0.0428	22	0.0269
Low carbon mild steel ..	12	0.0946	14	0.0677
Aluminum	.....	0.125	.....	0.1000

(f) An evacuated jacket must be in compliance with the following requirements:

(1) The jacket must be designed to sustain a minimum critical collapsing pressure of 30 psig.

(2) If the jacket also supports additional loads, such as the weight of the tank and lading, the combined stress, computed according to the formula in §178.338–3(b), may not exceed 25 percent of the minimum specified tensile strength.

[Amdt. 178–77, 48 FR 27703, June 16, 1983, as amended at 49 FR 24316, June 12, 1984; Amdt. 178–104, 59 FR 49135, Sept. 26, 1994; 66 FR 45387, Aug. 28, 2001]

§178.338–2 Material.

(a) All material used in the construction of a tank and its appurtenances that may come in contact with the lading must be compatible with the lading to be transported. All material used for tank pressure parts must conform to the requirements of the ASME Code. All material used for evacuated jacket pressure parts must conform to the chemistry and steelmaking practices of one of the material specifications of Section II of the ASME Code or the following ASTM Specifications: A 242, A 441, A 514, A 572, A 588, A 606, A 607, A 633, A 715.

(b) All tie-rods, mountings, and other appurtenances within the jacket and all piping, fittings and valves must be of material suitable for use at the lowest temperature to be encountered.

(c) Impact tests are required on all tank materials, except aluminum, and must be performed using the procedure prescribed in the ASME Code.

(d) The direction of final rolling of the shell material must be the circumferential orientation of the tank shell.

(e) Each tank constructed in accordance with part UHT of the ASME Code must be postweld heat treated as a unit after completion of all welds to the shell and heads. Other tanks must be postweld heat treated as required by the ASME Code. For all tanks the method must be as prescribed in the ASME Code. Welded attachments to pads may be made after postweld heat treatment.

(f) The fabricator shall record the heat and slab numbers and the certified Charpy impact values of each plate used in the tank on a sketch showing the location of each plate in the shell and heads of the tank. A copy of the sketch must be provided to the owner of the cargo tank and a copy must be retained by the fabricator for at least five years and made available, upon request, to any duly identified representative of the Department.

(Approved by the Office of Management and Budget under control number 2137–0017)

[Amdt. 178–77, 48 FR 27703 and 27713, June 16, 1983, as amended at 49 FR 24316, June 12, 1984]

§178.338–3 Structural integrity.

(a) *General requirements and acceptance criteria.* (1) Except as permitted in paragraph (d) of this section, the maximum calculated design stress at any point in the tank may not exceed the lesser of the maximum allowable stress value prescribed in section VIII of the ASME Code, or 25 percent of the tensile strength of the material used.

(2) The relevant physical properties of the materials used in each tank may be established either by a certified test report from the material manufacturer or by testing in conformance with a recognized national standard. In either case, the ultimate tensile strength of the material used in the design may not exceed 120 percent of the minimum